

What is claimed is:

1. An electrochemical cell, comprising:
- a) an anode;
  - 5 b) a cathode characterized as having been formed by a method consisting essentially of:
    - i) positioning a first electrode active material into a pressing fixture;
    - 10 ii) positioning a current collector screen on top of the first electrode active material;
    - 15 iii) positioning a second electrode active material different than the first electrode active material on top of the current collector screen, thereby forming an electrode assembly; and
    - 20 iv) pressing the electrode assembly to form the electrode; and
  - c) a separator electrically insulating the anode from the cathode; and
  - d) an electrolyte activating the anode and the cathode.
- 25 2. The electrochemical cell of claim 1 wherein the first electrode active material is in a powder form having at least some particles sized to be able to move through at least one opening in the current collector screen and wherein the second electrode active material
- 30 is in a form incapable of moving through the at least one opening in the current collector screen, and the electrode assembly is characterized as having been

SCANNED, # 24

pressed from the direction of the second electrode active material to the first electrode active material.

3. The electrochemical cell of claim 1 wherein the  
5 second electrode active material is in a sheet or pellet form.

4. The electrochemical cell of claim 1 wherein with  
the second electrode active material in a powder form it  
10 is capable of moving through the at least one opening in the current collector screen.

5. The electrochemical cell of claim 1 wherein the at  
least one opening is at least 0.004 inches in diameter.

15 6. The electrochemical cell of claim 1 wherein the first and the second electrode active materials are selected from the group consisting of  $\text{CF}_x$ ,  $\text{Ag}_2\text{O}_2$ ,  $\text{CuF}$ ,  $\text{Ag}_2\text{CrO}_4$ ,  $\text{MnO}_2$ ,  $\text{SVO}$ ,  $\text{CSVO}$ ,  $\text{V}_2\text{O}_5$ ,  $\text{LiCoO}_2$ ,  $\text{LiNiO}_2$ ,  $\text{LiMn}_2\text{O}_4$ ,  
20  $\text{CuO}_2$ ,  $\text{TiS}_2$ ,  $\text{Cu}_2\text{S}$ ,  $\text{FeS}$ ,  $\text{FeS}_2$ , copper oxide, copper vanadium oxide, and mixtures thereof.

7. The electrochemical cell of claim 1 wherein the  
anode is composed of lithium.

25 8. The electrochemical cell of claim 1 wherein the electrolyte includes a first solvent selected from the group consisting of tetrahydrofuran (THF), methyl acetate (MA), diglyme, triglyme, tetraglyme, dimethyl  
30 carbonate (DMC), 1,2-dimethoxyethane (DME), 1,2-diethoxyethane (DEE), 1-ethoxy-2-methoxyethane

(EME), ethyl methyl carbonate, methyl propyl carbonate, ethyl propyl carbonate, diethyl carbonate, dipropyl carbonate, and mixtures thereof, and the second solvent is selected from the group consisting of propylene carbonate (PC), ethylene carbonate (EC), butylene carbonate, acetonitrile, dimethyl sulfoxide, dimethyl, formamide, dimethyl acetamide,  $\gamma$ -valerolactone,  $\gamma$ -butyrolactone (GBL), N-methyl-pyrrolidinone (NMP), and mixtures thereof.

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9. The electrochemical cell of claim 1 wherein the electrolyte includes a lithium salt selected from the group consisting of  $\text{LiPF}_6$ ,  $\text{LiBF}_4$ ,  $\text{LiAsF}_6$ ,  $\text{LiSbF}_6$ ,  $\text{LiClO}_4$ ,  $\text{LiO}_2$ ,  $\text{LiAlCl}_4$ ,  $\text{LiGaCl}_4$ ,  $\text{LiC}(\text{SO}_2\text{CF}_3)_3$ ,  $\text{LiN}(\text{SO}_2\text{CF}_3)_2$ ,  $\text{LiSCN}$ ,  $\text{LiO}_3\text{SCF}_3$ ,  $\text{LiC}_6\text{F}_5\text{SO}_3$ ,  $\text{LiO}_2\text{CCF}_3$ ,  $\text{LiSO}_6\text{F}$ ,  $\text{LiB}(\text{C}_6\text{H}_5)_4$ ,  $\text{LiCF}_3\text{SO}_3$ , and mixtures thereof.

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10. The electrochemical cell of claim 1 wherein the current collector screens is selected from the group consisting of stainless steel, titanium, tantalum, platinum, gold, aluminum, cobalt nickel alloys, highly alloyed ferritic stainless steel containing molybdenum and chromium, and nickel-, chromium-, and molybdenum-containing alloys.

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11. The electrochemical cell of claim 1 wherein two of the pressed electrode structure are positioned back to back to provide the cathode having the configuration:

SVO/current collector screen/ $\text{CF}_x$ /

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current collector screen/SVO.

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12. An electrochemical cell, comprising:

- a) an anode;
- b) a cathode characterized as having been formed by the method consisting essentially of:

5                   i) positioning a first electrode active subassembly comprising a first electrode active material and a second electrode active material contacted to opposed sides of a first current collector into a pressing fixture;

10                   ii) positioning a third electrode active material different than either of the first and the second electrode active materials on top of one of the first and the second electrode active materials of the first electrode active subassembly;

15                   iii) positioning a second electrode active subassembly comprising the first electrode active material and the second electrode active material contacted to opposed sides of a second current collector on top of the third electrode active material to form an electrode assembly; and

20                   iv) pressing the electrode assembly to form the electrode;

25                   c) an electrolyte activating the anode and the

30                   cathode; and

- Table 1**

[illegible][illegible]

**Table 1**

- [illegible]

**Table 1**

at least one opening in the current collector screen and providing the second electrode active material in a form incapable of moving through the at least one opening in the current collector screen, and pressing the electrode assembly from the direction of the second electrode active material to the first electrode active material.

17. The method of claim 15 including providing the second electrode active material in a sheet or pellet form.

18. The method of claim 15 wherein with the second electrode active material in a powder form it is capable of moving through the at least one opening in the current collector screen.

19. The method of claim 15 including providing the current collector screen having the at least one opening being at least 0.004 inches in diameter.

20. The method of claim 15 including selecting the first and the second electrode active materials from the group consisting of  $\text{CF}_x$ ,  $\text{Ag}_2\text{O}$ ,  $\text{Ag}_2\text{O}_2$ ,  $\text{CuF}$ ,  $\text{Ag}_2\text{CrO}_4$ ,  $\text{MnO}_2$ ,  $\text{SVO}$ ,  $\text{CSVO}$ ,  $\text{V}_2\text{O}_5$ ,  $\text{LiCoO}_2$ ,  $\text{LiNiO}_2$ ,  $\text{LiMn}_2\text{O}_4$ ,  $\text{CuO}_2$ ,  $\text{TiS}_2$ ,  $\text{Cu}_2\text{S}$ ,  $\text{FeS}$ ,  $\text{FeS}_2$ , copper oxide, copper vanadium oxide, and mixtures thereof.

21. The method of claim 15 wherein the anode is lithium, the first cathode active material is  $\text{SVO}$ , the second cathode active material is  $\text{CF}_x$ .

22. A method for manufacturing an electrode, comprising the steps of:

- 5
- a) positioning a first electrode active subassembly comprising a first electrode active material and a second electrode active material contacted to opposed sides of a first current collector into a pressing fixture;
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- b) positioning a third electrode active material different than either of the first and the second electrode active materials on top of one of the first and the second electrode active materials of the first electrode active subassembly;
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- c) positioning a second electrode active subassembly comprising the first electrode active material and the second electrode active material contacted to opposed sides of a second current collector on top of the third electrode active material to form an electrode assembly; and
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- d) pressing the electrode assembly to form the electrode.

23. The method of claim 22 including providing the third electrode active material in a powder form.

24. The method of claim 22 including providing the first and second electrode active materials being either the same or different.

25. The method of claim 22 wherein with the first and the second electrode active materials in a powder form, they are capable of moving through the at least one opening in the current collector screen.

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26. The method of claim 22 including selecting the first, the second and the third electrode active materials from the group consisting of  $\text{CF}_x$ ,  $\text{Ag}_2\text{O}$ ,  $\text{Ag}_2\text{O}_2$ ,  $\text{CuF}$ ,  $\text{Ag}_2\text{CrO}_4$ ,  $\text{MnO}_2$ ,  $\text{SVO}$ ,  $\text{CSV}_2\text{O}_5$ ,  $\text{V}_2\text{O}_5$ ,  $\text{LiCoO}_2$ ,  $\text{LiNiO}_2$ ,  $\text{LiMn}_2\text{O}_4$ ,  $\text{CuO}_2$ ,  $\text{TiS}_2$ ,  $\text{Cu}_2\text{S}$ ,  $\text{FeS}$ ,  $\text{FeS}_2$ , copper oxide, copper vanadium oxide, and mixtures thereof.

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27. The method of claim 22 including providing the first and the second current collector screens having openings that are at least 0.004 inches in diameter.

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28. The method of claim 22 including providing the cathode having the configuration:

SVO/current collector screen/SVO/CFX/SVO/current collector screen/SVO.

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